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IS 10141 (2001): Positive List of Constituents of Polyethylene in Contact with Foodstuffs, Pharmaceuticals and Drinking Water [PCD 12: Plastics]

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भारतीय मानक

खाद्य सामग्री, औषधियों और पेय जल के सम्पर्क में पोलीइथाइलीन के संघटकों की निश्चित सूची

(पहला पुनरीक्षण)

Indian Standard

POSITIVE LIST OF CONSTITUENTS OF POLYETHYLENE IN CONTACT WITH FOODSTUFFS, PHARMACEUTICALS AND DRINKING WATER

(First Revision)

ICS 67.250;83.080.20

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

November 2001 **Price Group 4**

Plastics Sectional Committee, PCD 12

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Plastics Sectional Committee had been approved by the Petroleum Coal and Related Products Division Council.

Plastics are being used on a large scale for packaging of foodstuffs, drinking water and pharmaceuticals. Where direct contact occurs between the packed commodity and the plastics, the high-molecular mass polymer itself does not pose a toxic hazard being inert. There is, however, a likelihood that some transfer of polymer additives, adventitious impurities, such as monomers, catalyst remnants and residual polymerization solvents and of low molecular mass polymer fractions will occur from the plastics into the packaged material with consequent toxic hazard to the consumers of products packed in plastics. The occurrence of acute toxicity due to plastics materials in contact with foodstuffs is most unlikely, since only trace quantities of potentially toxic materials are likely to migrate. However, the accumulation of these materials with time may lead to hazards which may be serious.

This standard was first published in 1982. With the availability of newer, efficient and cost effective additives which can be safely used in contact with foodstuffs, pharmaceuticals and drinking water, the concerned Technical Committee has decided to revise this standard to incorporate more additives. In this revision, the following changes have been made:

a) Four amendments issued to this standard have been incorporated;

b) The permitted list of additives has been enlarged; and

c) The additives have been brought under the heading of auxiliary items for working instead of prescribing under various heads like lubricants, antioxidants, ultra-violet absorbers, anti-blocking agent, etc, which is the practice being followed until now.

The additives prescribed in this standard are based on the information available from the British Industrial Biological Research Association (BIBRA) and the British Plastics Federation (BPF), London, FDA Regulations (USA) and EEC Directives.

This standard is intended to be used with the series of Indian Standards on Plastics for food contact application which is given in Annex A.

The composition of the Committee responsible for formulation of this standard is given in Annex B.

Indian Standard

POSITIVE LIST OF CONSTITUENTS OF POLYETHYLENE IN CONTACT WITH FOODSTUFFS, PHARMACEUTICALS AND DRINKING WATER

(First Revision)

1 SCOPE

1.1 This standard covers positive list of constituents of polyethylene, namely the homopolymer, copolymers, terpolymers and blends of these polymers, manufacturing residues and auxiliary additives, which may be regarded as safe for use, when properly processed, in contact with foodstuffs, pharmaceuticals and drinking water and when present only in the prescribed limits of concentration.

1.2 It does not purport to establish the suitability of the ingredient singly in a particular foodstuff from other than toxicological considerations.

2 REFERENCE

The following Indian Standard contains provisions which, through reference in this text, constitutes provisions of the standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below:

IS No.	*Title*
9833 : 1981	List of pigments and colourants for use in plastics in contact with foodstuffs, pharmaceuticals and drinking water

3 TERMINOLOGY

3.1 Low Density Polyethylene (LDPE)

A basic resin produced by the polymerization of ethylene having nominal density in the range 908 to 923 kg/m^3 at 27°C (910 to 925 kg/ m^3 at 23°C.)

3.2 Medium Density Polyethylene (MDPE)

A basic resin produced by polymerization of ethylene and having nominal density in the range of 924 to 938 kg/m^3 at 27°C (926 to 940 kg/m^3 at 23°C).

3.3 High Density Polyethylene (HDPE)

A basic resin produced by polymerization of ethylene and having nominal density in the range of 939 to 963 kg/m^3 at 27°C (941 to 965 kg/m^3 at 23°C). Copolymers of ethylene with 1-alkenes containing upto 8 carbon atoms with minimum ethylene content of 85 percent and having nominal density of 939 to 963 kg/m^3 at 27°C (941 to 965 kg /m^3 at 23°C) also come under this definition.

3.4 Linear Low Density Polyethylene (LLDPE)

A basic resin (co, terpolymers or quattropolymers of ethylene with polypropylene) produced by polymerization of ethylene with comonomers of 1-alkene containing up to 8 carbon atoms with a minimum ethylene content of 85 percent by mass and having a nominal density in the range of 900 to 938 kg/m^3 at 27°C.

4 REQUIREMENTS

4.1 Basic Resin

4.1.1 Homopolymers of ethylene, copolymers or terpolymers of ethylene with the 1-alkenes defined under 3, blend of homopolymers of ethylene with one or more of the copolymers/terpolymers/ quattropolymers and blend of several copolymers/ terpolymers/ quattropolymers of ethylene mentioned under this clause.

4.1.2 Compliance with the list of polyethylene defined in **3** shall be made in such a way that it contains no residues or ingredients used in its manufacture other than those listed in **4.2**, **4.3** and/ or **4.4**.

4.2 Manufacturing Residues

Polyethylene may contain a total of not more than 0.2 percent by mass of ethylene and other hydrocarbons originating from ethylene and comonomer feed stock, aldehydes, ketones and organic peroxides or their decomposition products. It may also contain a total of not more than 0.2 percent by mass, measured by standard assay technique, of calcium, aluminium, silicon, titanium, magnesium, chromium (maximum 50 ppm), sodium carbonate, potassium carbonate, sodium chloride, potassium chloride and petroleum hydrocarbon fractions.

4.2.1 The residues of the following products may constitute less than 0.3 percent by weight of the finished polymer:

a) Alkyl, benzene, alkyl-benzene sulphates of sodium, potassium and ammonium, the alkyl group containing C_{10} to C_{20};

b) Alkyl, benzene, alkyl-benzene sulphonates of sodium, potassium and ammonium, the alkyl group containing C_{10} to C_{20};

c) Condensation products of ethylene oxide with monohydric aliphatic alcohols (C_{12} to C_{20}) and their sodium sulphates;

d) Condensation products of ethylene oxide with monobasic aliphatic acids C_{12} to C_{20} and their sodium and ammonium sulphates;

e) Condensation products of propylene oxide with monobasic aliphatic acids (C_{12} to C_{20}) and their sodium and ammonium sulphates;

f) Polyvinyl alcohols (viscosity of a 4 percent aqueous solution at 20°C should be at least 4 centipoises);

g) Magnesium; Zirconium; Vanadium; Ethoxides/Alcoxides; and C_1 to C_5 alcohols

4.2.2 *Catalyst Residues*

The residues of the catalyst and their products of decomposition, measured by standard assay technique, shall not exceed 0.2 percent by mass of the finished products.

4.3 Auxiliary Items for Working

The auxiliary items prescribed in Table 1 may be used to maximum level, percentage weight/weight, of the final product in polyethylene polymers given in **3**.

4.4 Pigments and Colourants

The pigments and colourants used shall comply with list and limits prescribed in IS 9833.

Table 1 Auxiliary Items
(*Clause* 4.3)

Chemical Name	Maximum Level of Use Percentage Weight/Weight of Final Product
Aluminium silicate	50
Aluminium stearate	3
Behenic acid	1
Benzene propanoic acid 3-(1, 1-dimethyl ethyl)-β (3,1-dimethylethyl)-4 -hydroxyphenyl-4 hydroxy-β methyl-1, 2-ethanediyl ester	0.5
1, 4-Benzenedicarboxylic acid, bis [2-(1, 1-dimethyl ethyl)-6-[[3-(1,1-dimethylethyl)-2-hydroxy-5-methyl phenyl] methyl]-4-methyl phenyl] ester	0.075
1,2-Bis (3,5-di-*tert*-butyl-4hydroxyhydrocinnamoyl)-hydrazine	-
β,3(or4)-Bis(octadecylthio)cyclohexylethane	0.3
2, 6 Bis (1-methyl heptadecyl)-*p*-cresol	0.3
3,9-Bis[2-{3-(3-*tert*-butyl-4-hydroxy-5-methylphenyl) propionyloxy}-1,1-dimethylethyl]-2,4,8,10-tetraoxaspiro[5,5]undecane	0.3
5,7-bis1,1-dimethylethyl-3-hydroxi-2(3H)-benzofuranone, reaction products with *o*-xylene	0.02
Bis(*p*-ethylbenzylidene)sorbitol	0.3
2, 5 bis 5'-*tert*-butylbenzoxalyl (2) thiophene	0.02[1]
Bis (2, 4-di-*tert*-butyl phenyl) pentaerythritol diphosphite with upto 1% tri-isopropanolamine	0.1
N,N-Bis (2-hydroxyethyl) alkyl (C12-C18) amine	0.1
2-(3'-*tert*-Butyl-2'-hydroxy-5'-methyl-phenyl)-5-chlorobenzotriazole having melting range of 137-141°C	0.5
Bis [2,2' methylene bis 4 methyl- 6-*tert* butyl phenol] terephthalate	0.1
Butylated hydroxyanisole	0.05
Butylated hydroxytoluene	0.2
Butyl lactate	5
n-Butyl stearate	5
Butyric acid, 3,3-bis(3-*tert*-butyl-4-hydroxyphenyl)ethylene ester	0.5
Calcium benzoate	2
Calcium carbonate	25
Calcium bis [monoethyl 3,5-di-*tert*-butyl-4-hydroxybenzyl phosphonate]	0.2[2]

Table 1 (*Continued*)

Chemical Name	Maximum Level of Use Percentage Weight/Weight of Final Product
Calcium hydroxide	0.1
Calcium octoate	1.5
Calcium oxide	10
Calcium oxide dispersion	20
Calcium palmitate	5
Calcium stearate	5
Carbon black	5
Cyclic neopentanetetrayl bis (octadecyl phosphite)	0.25
4,4' Cyclohexylidenebis (2-cyclohexyl phenol)	0.1
Citric acid monohydrate	0.01
Dibenzylidene sorbitol	0.25
2,6 Di-*tert*-butyl-4-ethyl phenol	0.01 3)
2,6-Di(α-methyl benzyl)-4-methyl phenol	0.2
3,5-Di-tert-butyl-4-hydroxyhydrocinnamic acid triester with 1,3,5-tris(2-hydroxyethyl)-5-triazine-2,4,6-(1h, 3h, 5h) trione	0.5
Di-*tert*-butylphenyl phosphonite condensation with biphenyl	0.1
2,4-Di-*tert*-butylphenyl-3,5-di-*tert*-butyl-4-hydroxy-benzoate	0.3 1)
Dilauryl thiodipropionate	1.0
Dimethyl dibenzylidene sorbitol	0.4
Disteryl thiodipropionate	1.0
2,4-Dimethoxy-6-(-1-pyrenyl)-s-triazine	0.01
Dimethyl succinate polymer with 4-hydroxy2,2,6,6-tetramethyl 1-piperidylene ethanol	0.3
Distearyl pentaerythritol diphosphite	0.3
N,N' Distearoyl ethylenediamine	5
n-Dodecanol	2
Dolomite	2 4)
Di-*tert*-butylphenyl phosphonite condensation product with bisphenyl	0.1
Erucamide	0.2
Epoxidised soyabean oil	0.5
2,2'-Ethylidenebis (4, 6-di-*tert*-butylphenol)	0.05
Fluoroelastomer	—
Fumaric acid	2.5
Glycerine	3.5
Glyceryl oleate	3
Glyceryl monostearate	3
Glyceryl ricinoleate	3
Glyceryl triacetate	30
Heavy liquid paraffin	10
Hexadecyl 3,5-di-*tert* butyl-4-hydroxy benzoate	0.5
Hydrotalcite (basic magnesium aluminium carbonate hydrate)	0.3
2-Hydroxy-4-*iso*-octoxy-benzophenone	0.5
2 2'-Hydroxy -3'-*tert*-butyl-5'-methylphenyl-5-chloro- benzotriazole (having menting range of 126-132)	0.5
2(2'-Hydroxy 5'-methyl phenyl) benzotriazole	0.5
2-Hydroxy-4-*n*-octoxy-benzophenone	3.5
Lauric diethanolamide	0.5
n-Lauroylsarcosine	0.4 5)
Magnesium benzoate	2
Magnesium oxide	0.05
Magnesium stearate	1
Maleic anhydride grafted polyethylene	10
Mannitol	2.5
2.2'-Methylene bis (4-methyl-6-*tert*-butyl phenol)	0.01
2,2'-Methylene bis 6-(1-methylcyclo-hexyl)-*p*-cresol	0.2
4,4'-Methylene bis (2'6-di-*tert*-butyl-phenol)	0.5

Table 1 (*Continued*)

Chemical Name	Maximum Level of Use Percentage Weight/Weight of Final Product
Mono & di glycerides of fatty acids	3
7,[2 h Naphtho (1,2-d)triazol-2-yl] 3-phenylcoumarin	0.1
2:1 Nickel complex of 3,5-di-*tert*-butyl-4-hydroxy-benzyl monoethylphosphonate	0.3
Non-oxidised polyethylene wax	8
Oleamide	0.2
Octadecyl hydroxyhydrocinnamate	0.25
Oxidised bis(hydrogenated tallow alkyl) amine	0.05
2,2'-Oxamidobis[ethyl-3-(3,5-di-*tert*-butyl-4-hydroxyphenyl) propionate]	0.5
Phosphorous acid, cyclic butylethyl propanediol, 2,4,6-tri-*tert*-butylphenyl ester	0.2
Phosphoric acid, cyclic neopentane tetrayl bis(2,4-di-*tert*-butylpheyl) ester	0.1
Poly[6-morpholino-s-triazine-2, 4-diyl [2,2,6,6-tetremethyl-4-piperidyl-1)imino] hexamethylene[2,2,6,6-tetramethyl-4-piperidyl)imino]	—
Polyvinyl cyclohexane	0.1
Pentaerythritol	3
Polyisobutylene	5
Polydimethyl siloxane	5
Polyoxyethylene (20) sorbitan monolaurate	3
Polyoxyethylene (20) sorbitan monooleate	3
Polyoxyethylene (20) sorbitan monopalmitate	3
Polyoxyethylene (20) sorbitan monostearate	3
Polyoxyethylene (20) sorbitan tristearate	3
Polyoxyethylene (20) sorbitan trioleate	3
Poly [6(1,1,3,3-tetramethyl butyl amino) 1,3,5-triazine-2,4-diyl] [4-(2,2,6,6-tetramethyl-piperidyl) imino]-hexamethylene [4-(2,2,6,6-tetramethyl piperidyl) imino]	0.3
Polypropylene glycol	0.5
Silicon dioxide	10
Sodium alkylsulphonate	2.5
Sorbitan monolaurate	3
Sorbitan monooleate	3
Sorbitan monopalmitate	3
Sorbitan monostearate	3
Sorbitan trioleate	3
Sorbitan tristearate	3
Sodium di(p-*tert*-butylphenyl) phosphate	0.35
Sodium 2,2'-methylenebis(4,6-di-*tert*-butylphenyl) phosphate	0.3
2-Stearamido-ethyl stearate	3
Stearic/palmitic acid	5
Stearamide	0.2
Styrenated *p*-cresol	0.2[6]
Talc	30
Terpolymer of ethylene propylene and 1,4 hexadiene	25
Tetrakis-(2,4-di-*tert*-butyl-phenyl)-4,4'- biphenylene diphosphonite	0.2
Tetrakis[methylene-3-(3',5'-di-*tert*-butyl-4'-hydroxyphenyl) propionate] methane	0.5
4,4'-Thio-bis (6-*tert*-butyl-*m*-cresol)	0.25
Thiodipropionic acid	0.1
Titanium dioxide	20
1,3,5-Trimethyl-2,4,6-tris (3,5-di-*tert*-butyl-4-hydroxy benzyl) benzene	1
Tri (mixed mono and dinonyl phenyl) phosphite	1
1,3,5-tris 4-*tert*-butyl-3-hydroxy-2,6-dimethyl-benzy 1,3,5-triazine 2,4,6 (1h,3h, 5h)- trione	0.1
1,3,5-tris(3,5-di-*tert*-butyl-4-hydroxyhydrocinnamoyl)hexahydro-s-triazine	0.1
1,3,5-Tris (3,5-di-*tert*-butyl-4-hydroxy-benzyl)-s triazine-2,4,6 (1h, 3h, 5h) trione	0.1
2-[2,4,8,10-tetrakis(1,1-dimethyl)benzo[d,f][1,3,2]-dioxaphosphepin-6-yl]-N,N-bis[2[[2,4,8,10-tetrakis(1,1-dimethylethyl)dibenzo[d,f][1,3,2]dioxaphosphepin-6-yl]oxy]ethyl]ethan amine	0.075
Tris (2, 4, di-*tert*-butylphenyl) phosphite	0.2

Table 1 (*Concluded*)

Chemical Name	Maximum Level of Use Percentage Weight/Weight of Final Product
Trisodium phosphate	0.1
1,1,3-Tris (2-methyl-4-hydroxy-5-*tert*-butylphenyl) butane	0.25[1]
Vinylidene fluoride/hexa fluoropropylene copolymer	0.05
Zinc benzoate	2
Zinc di-(2-ethylhexanoate)	1.5
Zinc stearate	3

[1] Non-fatty food only.
[2] In polyethylene and its copolymers having density less than 940 kg /m^3.
[3] Maximum thickness of article in contact with foodstuff and pharmaceuticals shall be 0.025 inch (0.063 5 cm).
[4] Non-acidic food only.
[5] Film only.
[6] Not for food contact above 65°C.

ANNEX A

(*Foreword*)

LIST OF INDIAN STANDARDS ON PLASTICS SUITABLE FOR USE IN CONTACT WITH FOODSTUFF, PHARMACEUTICALS AND DRINKING WATER

IS No.	*Title*
9833 : 1981	List of pigments and colourants for use in plastics in contact with foodstuffs, pharmaceuticals and drinking water
9845 : 1998	Method of analysis for determination of specific and/or overall migration of constituents of plastics materials and articles intended to come into contact with foodstuffs (*second revision*)
10142 : 1999	Polystyrene (crystal and high impact) for its safe use in contact with foodstuffs, pharmaceuticals and drinking water (*first revision*)
10146 : 1982	Polyethylene for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10148 : 1982	Positive list of constituents of polyvinyl chloride and its copolymers for safe use in contact with foodstuffs, pharmaceuticals and drinking water
10149 : 1982	Positive list of constituents of polystyrene (crystal and high impact) in contact with foodstuffs, pharmaceuticals and drinking water
10151 : 1982	Polyvinyl chloride (PVC) and its copolymers for pharmaceuticals and drinking water
10171 : 1999	Guide on suitability of plastics for food packaging (*second revision*)
10909 : 2001	Positive list of constituents of polypropylene and its copolymers in contact with foodstuffs, pharmaceuticals and drinking water (*first revision*)
10910 : 1984	Polypropylene and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11434 : 1985	Ionomers resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11435 : 1985	Positive list of constituents of ionomer resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11704 : 1986	Ethylene/acrylic acid (EAA) copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11705 : 1986	Positive list of constituents of ethylene/acrylic acid (EAA) copolymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
12229 : 1987	Positive list of constituents of polyalkylene terephthalates (PET &

IS No.	*Title*
	PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
12247 : 1988	Nylon-6 polymer for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12248 : 1988	Positive list of constituents of nylon-6 polymer for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12252 : 1987	Polyalkylene terephthlates (PET&PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
13449 : 1992	Positive list of constituents of ethylene vinyl acetate (EVA) copolymers in contact with foodstuffs, pharmaceuticals and drinking water
13576 : 1992	Ethylene methacrylic acid and (EMAA) copolymers and terpolymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
13601 : 1993	Ethylene vinyl acetate (EVA) copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
14971 : 2001	Polycarbonate resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
14972 : 2001	Positive list of constituents of polycarbonate resins in contact with foodstuffs, pharmaceuticals and drinking water
14996 : 2001	Positive list of constituents of modified poly (phenylene oxide) (PPO) in contact with foodstuffs, pharmaceuticals and drinking water
14997 : 2001	Modified poly (phenylene oxide) (PPO) resins for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
14998 : 2001	Positive list of constituents of melamine-formaldehyde resins in moulded articles in contact with foodstuffs, pharmaceuticals and drinking water
14999 : 2001	Melamine-formaldehyde moulding materials for its safe use in contact with foodstuffs, pharmaceuticals and drinking water

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Plastics Sectional Committee, PCD 12

Organization	*Representative(s)*
Internet Exchange Next.com Limited, Mumbai	Shri Sarup Chowdhary (***Chairman***)
Amines and Plasticizers Ltd, Mumbai	Shri V. V. Kulkarni Dr R. V. Utekar (*Alternate*)
Bakelite Hylam Ltd, Hyderabad	Dr C. S. Narasimhan Dr M. Balakrishnan (*Alternate*)
Building Materials and Technology Promotion Council, New Delhi	Shri J. Sengupta
Central Institute of Plastics Engg and Technology, Chennai	Dr Vijai Kumar Dr K. Palanivelu (*Alternate*)
Central Food Technological Research Institute, Mysore	Shri S. K. Kumar Shri Baldev Raj (*Alternate*)
Gas Authority of India Ltd, Noida	Shri Shivaji Basu Shri V. K. Singh (*Alternate* I) Shri Manish Khandelwal (*Alternate* II)
GE Plastics India Limited, Gurgaon	General Manager Dr Rashmi Bhardwaj (*Alternate*)
Gharda Chemicals Ltd, Thane	Dr B. K. Desai Dr U. M. Vakil (*Alternate*)
Gujarat State Fertilizers Company Limited, Vadodara	Shri B. D. Adhvaryu Dr Y. P. Singh (*Alternate*)
Haldia Petrochemicals Ltd, Kolkata	Shri Shankar Banerjee Shri Amitava Sanyal (*Alternate*)
Hindustan Polymers Ltd, Mumbai	Shri S. V. Parveen Shri N. C. Dhocendranath (*Alternate*)
Indian Centre for Plastics in Environment	Dr A. N. Bhat
Indian Petrochemicals Corporation Limited, Vadodara	Shri J. B. Kamat Shri V. C. Francis (*Alternate*)
Indian Institute of Packaging, Mumbai	Shri P. V. Narayanan Dr N. G. Mokashi (*Alternate*)
Indian Plastics Institute, Mumbai	Shri D. R. Patel Shri R. K. Aggarwal (*Alternate*)
Indian Toxicological Research Centre, Lucknow	Dr V. P. Sharma
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Ministry of Defence (R&D), Kanpur	Shri M. N. Saraf Dr L. D. Khandpal (*Alternate*)
Ministry of Defence, RDSO, Lucknow	Joint Director (Rubber) Director (SS) (*Alternate*)
Ministry of Health and Family Welfare, DGHS, New Delhi	Addl Director General (PFA) Shri Sundar Lal (*Alternate*)
Ministry of Food Processing Industries, New Delhi	Shri O. P. Gera
National Chemical Laboratory, Pune	Dr S. S. Mahajan Dr S. S. Kulkarni (*Alternate*)
National Dairy Development Board, Anand	Dr R. S. Lathana Shri S. K. Khandelwal (*Alternate*)
National Organic Chemical Industries Ltd, Mumbai	Shri V. K. Sharma Shri J. K. Vadodaria (*Alternate*)
Nuchem Ltd, Faridabad	Dr R. M. Mehta
Permali Wallace Ltd, Bhopal	Shri C. C. Sakarda Shri S. K. Kodesia (*Alternate*)
Reliance Industries Ltd, Mumbai	Dr Y. B. Vasudeo Dr K. S. Jadhav (*Alternate*)
Saint-Gobain Vetrotex India Ltd, Hyderabad	Shri S. Sundaram Shri S. K. Ghosh (*Alternate* I) Dr B. J. C. Basu (*Alternate* II)
Shivalik Agro-Poly Products Ltd, Parwanoo (H.P.)	Shri Arun Anand Shri Yog Raj Kapur (*Alternate*)

(*Continued on page* 8)

(*Continued from page* 7)

Organization	*Representative(s)*
Shriram Fertilizers & Chemcials, Kota	Shri M. S. Tripathi Shri R. C. Gupta (*Alternate*)
Shriram Institute for Industrial Research, Delhi	Dr R. C. Sood
Supreme Petrochem Ltd, Mumbai	Shri R. Rangarajan Shri B. A. Rakhangi (*Alternate*)
Tata Engg & Locomotive Co Ltd, Jamshedpur	Shri U. K. Nath Smt A. D. Sathe (*Alternate*)
The All India Plastics Manufacturers Association, Mumbai	Shri R. K. Aggarwal Shri K. B. Easwaran (*Alternate*)
The Plastics & Linoleums Export Promotion Council, Mumbai	Shri R. P. Kalyanpur
VIP Industries, Mumbai	Shri Siddhartha Roy Shri A. S. Dalve (*Alternate*)
XPRO India Ltd, Faridabad	Shri C. Bhaskar Shri Manmohan Krishan (*Alternate*)
BIS Directorate General	Shri Anjan Kar, Director & Head (PCD) [Representing Director General (*Ex-officio*)]

Member-Secretary
Shri T. Kalaivanan
Joint Director (PCD), BIS

Plastics in Food Packaging and Allied Industries Subcommittee, PCD 12:12

Central Food Technological Research Institute, Mysore	Shri K. R. Kumar (***Convener***)
All India Plastic Industries Association, Delhi	Shri Ravi Kumar
AS & T India Limited, New Delhi	Shri G. D. Agrawal
Bakelite Hylam Ltd, Mumbai	Dr C. Shankar Shri S. N. Murthy (*Alternate*)
Britannia Industries Ltd, Bangalore	Shri G. S. Aurora Shri M. R. Sundar (*Alternate*)
Centre for Processed Food, Bangalore	Shri R. Prakash Shri Chetan L. Hanchate (*Alternate*)
Central Committee for Food Standards (Directorate General of Health Services), New Delhi	The Asstt Director General (PFA)
Central Food Laboratory, Kolkata	Dr K. C. Guha Dr S. Vanchinathan (*Alternate*)
Defence Food Research Laboratory, Mysore	Shri Anil Agarwal Shri A. N. Srivastava (*Alternate*)
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